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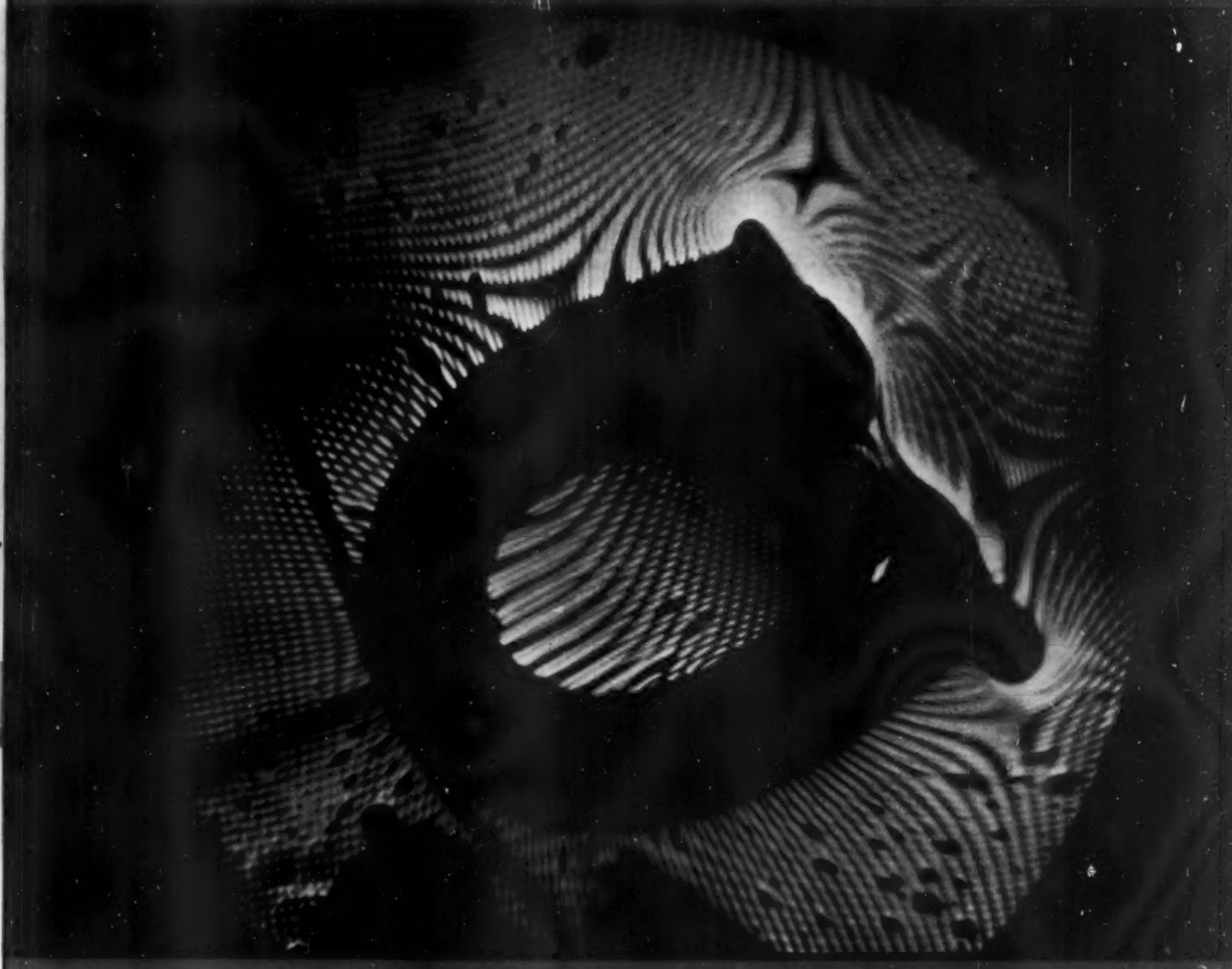
AUGUST 27, 1949

SCIENCE NEWS LETTER

AUG 29 1949
DETROIT

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Shadow Photography

See Page 141

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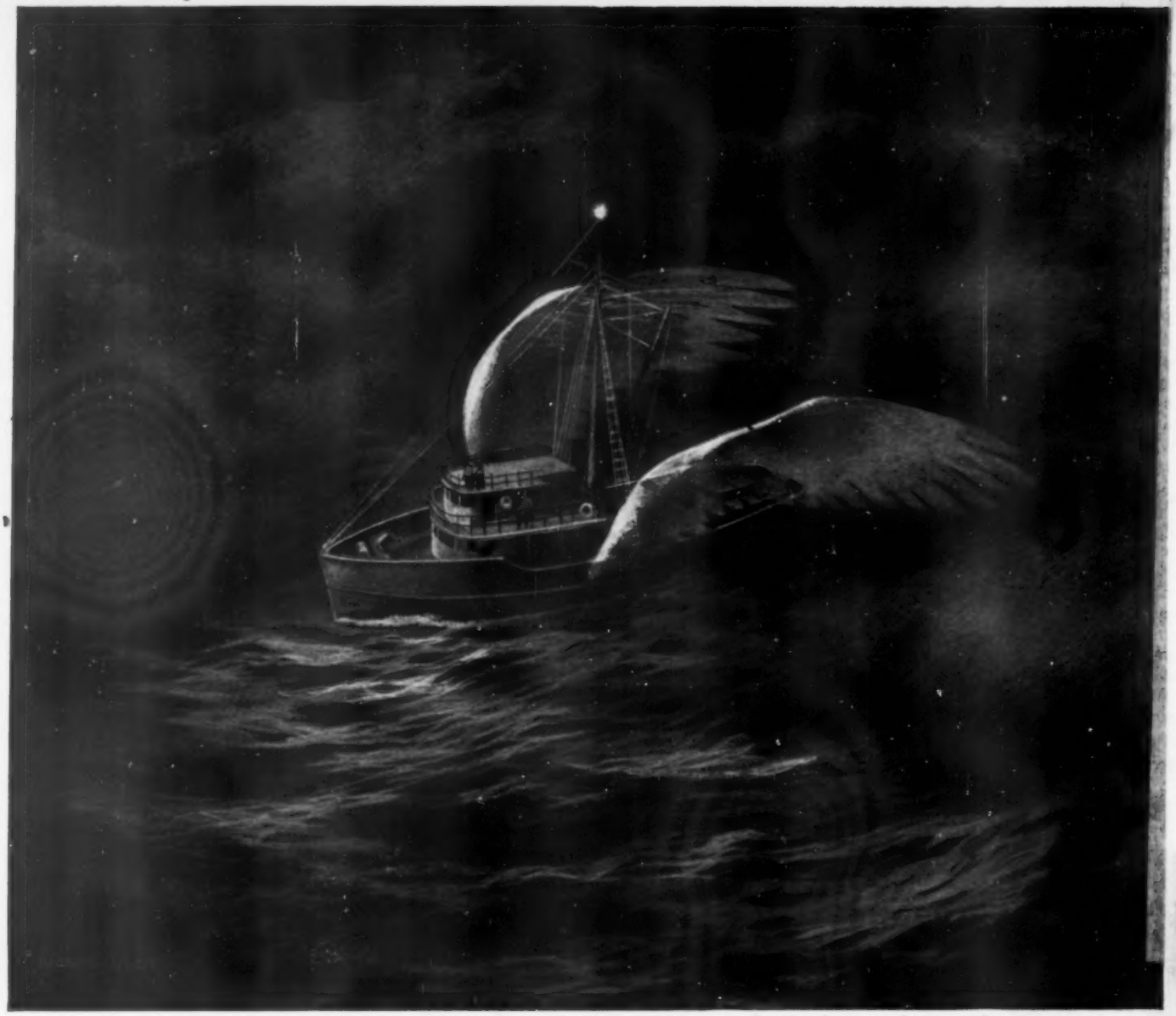


RCA scientists develop new *direct-reading* Loran instrument which simplifies problems of navigation.

The **homing pigeon** goes to sea

Now science gives the navigator an improved "homing pigeon instinct," a way which—without checking the sun or the stars—he can head his ship directly home.

Already thoroughly proved, *Loran equipment* has been simplified through RCA research and engineering, so that almost anyone can learn to use it in a few minutes. Free of human error, readings appear *directly* on the instrument. A quick check gives position.

Brain of this Loran system is a circuit developed at RCA Laboratories which splits seconds into millions of parts—and accurately measures the difference in the time it takes a pair of radio signals to travel from shore to ship.

Given this information, the navigator, hundreds of miles from shore, can determine his position quickly and accurately. Loran's simplicity adapts it to every type of vessel from merchant ship to yacht. Manufactured by Radiomarine Corporation of America, a service of RCA, it is already being installed in U. S. Coast Guard rescue ships.

The meaning of RCA research

RCA's contribution to the development of this new direct-reading Loran is another example of the continued leadership in science and engineering which adds *value beyond price to* any product or service of RCA.

* * *

The newest advances in television, radio, and electronics can be seen in action at RCA Exhibition Hall, 36 West 49th St., N. Y. Admission is free. Radio Corporation of America, RCA Building, Radio City, N. Y. 20.

RADIO CORPORATION of AMERICA

World Leader in Radio—First in Television

MEDICINE

New Polio-Like Disease

Isolation of a virus has been made which produces symptoms in its victims which resemble mild polio. The disease was found in 1948 polio-diagnosed patients.

➤ POLIO symptoms may no longer point to polio infection but to a new virus disease which resembles it. Isolation of a virus which produces symptoms similar to the non-paralyzing form of polio was announced by Yale University.

Discovery of the virus which has up to now been masquerading as polio was made in patients living in cities hard-hit by polio last year, which was the second worst polio year on record.

Its existence was first suggested by Gilbert Dalldorf and Grace Sickles of the New York State Department of Health in Albany, N. Y. The new findings, which confirm the original discovery, were made by Drs. Joseph L. Melnick, Ernest W. Shaw, and Edward C. Curnen of the Yale School of Medicine and are reported in the PROCEEDINGS OF THE SOCIETY FOR EXPERIMENTAL BIOLOGY AND MEDICINE (July).

Little is known about the new disease caused by a virus which has as yet no name. But it has been found to break out at the same time as polio in the summer season. The scientists believe that a fairly large number of patients were afflicted with the new disease last year and were falsely diagnosed as having polio.

Basis for this belief was the discovery of the virus in the sewage of last year's polio epidemic areas. Six cities—Hartford, Norwalk, and New Haven, Conn., and Greensboro, High Point, and Winston-Salem, N. C.— yielded the virus on examination of their sewage. Moreover, flies tested for the new virus in Hartford, Conn., and High Point, N. C., as well as in the lower Rio Grande Valley of Texas, were found to be infected.

Animal experiments revealed that infant mice are susceptible to the new virus but older mice are not, nor is the monkey which is used for polio research. The chimpanzees, on the other hand, became infected but were not visibly sick.

There are many strains of the new virus which at present fall into two basic types unrelated to each other or to the polio virus, the Yale scientists declared.

Science News Letter, August 27, 1949

MEDICINE

Hormone May Rejuvenate

Cortisone, besides showing promise against arthritis, has been found to renew some body tissues broken down by the aging process.

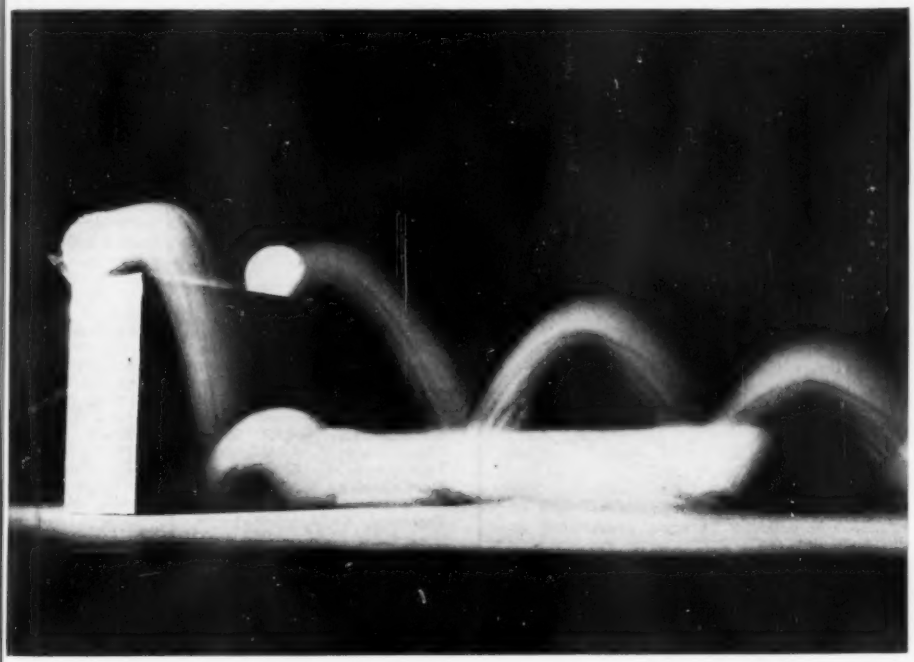
➤ THE fountain of youth for aging people and a defense against more of the chronic diseases than arthritis may be found in cortisone and similar hormones so dramatically effective in making the rheumatically crippled get up and walk.

That is the reason that there is an intensive search for new raw materials for synthesizing this adrenal cortical hormone. That is why the U. S. Public Health Service is asking $1,750,000 in emergency money to speed the medical research and investigation.

There is official excitement over the fact that a vine, growing of which is illegal in Africa, has seeds that under certain conditions contains a substance, called 11-oxysteroid, from which cortisone can be made. This is true despite the fact that it may take years to explore, prove and cultivate the strophanthus plants whose seeds seem to substitute so conveniently for the bile of slaughtered cattle that is now the starting point of cortisone synthesis.

Relief of 7,000,000 arthritics and over 100,000 rheumatic fever patients in the USA is the obvious but distant goal, but of deeper import is discovery that the substance that treats the patients so effectively actually seems to restore some of the tissues of the body that have been supposedly irreversibly changed by the inevitable process of aging. Cortisone seems to have a beneficial effect upon the metabolism of the collagens, the fibrous proteins that give support to the skin, tendons and bones.

In Mayo Clinic human experiments, much to the surprise of the investigators, old joints that were stiff were loosened up and the connective tissues were found to be physiologically renewed. This is the basis of renewed hope that a discovery



SUPER-COLD TEMPERATURE—Temperatures ranging to within a degree or so above absolute zero—459.7 degrees below zero on the Fahrenheit scale —have been made possible by a new "push-button" laboratory headed by Dr. Aaron Wexler of Westinghouse Research Laboratories. This will help scientists probe into how matter behaves at super-cold conditions. Here the tennis ball at left has been dipped in liquid nitrogen, 340 degrees below zero Fahrenheit. The ball at right is in its natural state. The super-cold ball rolls without bouncing when pushed off a pedestal while the other ball bounds.

even beyond the successful treatment of the rheumatic diseases has been made.

Cortisone is also being tried, experimentally, in certain kinds of cancer.

The supply of this hormone, produced by Merck and Co. in what is called the most complex and difficult chemical synthesis of commercial or medical value, is still extremely small. Only a score or two of patients, who have to be given the drug every day, have been treated. The drug is of course priceless, but it costs at least $20 a day to sustain a patient with 100 milligrams of cortisone which is valued at $200 to $400 a gram. Next year production from ox bile (it takes 40 cattle to produce enough for one day's treatment) will supply about 2,000 to 2,500 patients.

If some substitute for the bile from the slaughter houses could be found, the quantity might be larger.

In 1915 Drs. Walter A. Jacobs and Michael Heidelberger of the Rockefeller Institute in New York isolated from the seeds of strophanthus a chemical substance they called sarmentogenin. Cortisone's chemical ancestor, 20 steps closer to the final product than the bile acid starting point, was found to have the essential chemical structure duplicated in the African seed chemical. Here then was a chance to produce the final hormone from a plant that could be cultivated like other crops with a supply independent of the demand for meat and the amount of cattle slaughtered.

A strophanthus search is in progress. A Swiss group under Prof. Tadeus Reichstein of Basle was in the field first, because they were looking for a plant source for sex hormones that mean so much to the happiness of the human race. They found the desired plants and seeds in Africa. But there are complications for there are about 30 species of strophanthus and only one, *Strophanthus sarmentosus*, appears to produce the desired 11-oxy-steroid chemical grouping and then only under certain growing conditions and at certain times of seed growth.

A two-man expedition, Dr. John T. Baldwin of the U. S. Department of Agriculture and Dr. Erich Mosettig, of the U. S. Public Health Service, are in Basle beginning to track down strophanthus. First checking up the Swiss work, which has actually produced a small amount of cortisone from strophanthus, Dr. Baldwin will then collect plants, seeds and cuttings in the African area between Liberia and the Cameroons where the vine is supposed to grow best.

Natives are prohibited from raising the vine because they have used it in making an arrow poison and in making a brew with which charged criminals were tried—usually to die of the powerful heart-stimulating glucocides in the potion they were forced to drink (not the same chemicals used as the cortisone raw material).

So Dr. Baldwin will be searching mountain tops and isolated trees for the illicit vines to be brought back to this country for the sake of medicine. Probably cultivation of the plant will be legalized under controlled conditions, just as poppies are raised for opium.

Some years ago Dr. David Fairchild, veteran plant explorer, sent back from Africa some strophanthus plants and they were grown in Florida, Cuba, Puerto Rico, and the Canal Zone. All of them flowered beautifully but strangely only the one near Coconut Grove, Fla., bore seeds. These plants are being studied anew but they may not be the right species.

All plant and animal sources for steroid chemicals out of which cortisone could be made are being sought. Chemists believe they can make the hormone out of mothballs and vinegar (naphthalene and acetic acid) but it would be a long and expensive process. They would rather start with something upon which nature has already done most of the synthesizing.

Science News Letter, August 27, 1949

Words in Science—
SYMPTOM-SYNDROME

➤ A SYMPTOM, you say it simp-tum, is a sign of disease or of some physical or mental condition. It is what the doctor looks for in order to diagnose what is wrong with his patient.

A syndrome, pronounced sin-drome, is a set or pattern of symptoms that occur together—the total of all the signs that are evident in the presence of any disease or condition.

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Question Box

DENTISTRY

What is the new theory on how tooth decay starts? p. 135.

ENGINEERING

What is the purpose of a device which writes a "daily diary in dust?" p. 134.

GENERAL SCIENCE

What conclusions has a committee on civil liberties for scientists drawn? p. 133.

MEDICINE

What new light has been thrown on symptoms resembling mild polio? p. 131.

What shows promise of yielding material for the anti-arthritic hormone production? p. 131.

When is malaria expected to be wiped out in this country? p. 140.

METEOROLOGY

What are the locations of ten weather stations in the North Atlantic? p. 141.

PSYCHIATRY

What new profession is being pioneered? p. 141.

Photographs: Cover, National Bureau of Standards; p. 131, Westinghouse Research Laboratories; p. 133, Dr. A. A. Allen; p. 135, General Electric Co.

GENERAL SCIENCE

Loyalty Order Harmful

Brilliant scientific minds will be denied to the furtherance of research in atomic energy under present security clearance procedures, AAAS warns.

➤ A WARNING that atomic energy development "will be shunned by men of ability and pride" if present trends in security clearance of scientists continue was sounded by a special committee of the nation's largest general science organization, the American Association for the Advancement of Science.

Conclusions of the AAAS's special committee on civil liberties for scientists, which include an attack on the loyalty order for federal employees, were published in the Association's journal, SCIENCE (Aug. 19). The full, 77-page report of the six-man committee is still undergoing revision prior to publication, it was announced.

Three main conclusions of the report are:

1. "Secrecy is damaging to both science and democracy."

2. "If nothing is done to reverse the present trend to require security clearance of scientists who do not have or desire to have access to restricted data, it is likely that many of the most penetrating and original scientific minds will be turned to pursuits unrelated to further development of the atomic energy program.

"Work in that field will be shunned by men of ability and pride if they are constantly treated as objects of suspicion and possible calumny."

3. "Until the loyalty order deals with the way employees act rather than with the way they supposedly think, we shall inhibit the freedom and encourage the insecurity of our public servants."

The committee was formed in Dec. 1947, with Dr. Maurice B. Visscher, University of Minnesota physiologist, as chairman. At present, Dr. Visscher and Dr. E. C. Stakman, University of Minnesota plant pathologist and president of the Association, are working on revision of the full report, the journal stated.

Members of the committee are: Dr. Philip Bard, physiologist of the Johns Hopkins University; Dr. Robert E. Cushman, Cornell University political scientist; Dr. Richard L. Meier, an American scientist now working in an English research laboratory; and James R. Newman, a Washington lawyer and author who is a contributing editor of New Republic magazine. Walter Gellhorn of the Columbia University Law School served as consultant to the committee.

Military clearance procedures for civilian scientists are attacked by the report on grounds that military men determine whether or not clearance is granted, and the only appeal for the civilian scientist not cleared is to another military body, the Industrial Employment Review Board.

"Such subjection of the destinies of civilians to military tribunals is contrary to national tradition," the report asserts.

The U. S. Atomic Energy Commission is accused by the committee of "excessive precautions" which, it finds, "discourage participation in important research activities closely linked to the nation's well-being."

There is, the report suggests, a tendency to require security clearance of scientists who will not be dealing with classified, or restricted data, except through personal contact with other scientists. Only one-tenth of the scientists at the Brookhaven National Laboratory of the AEC on Long Island work with secret material, the committe estimates, but all scientists at the laboratory must be cleared before they can work there.

"This apparently reflects a yielding to uninformed or sensationalist legislators and others who tend to exaggerate the problem of 'keeping our atomic secrets,'" the report contends.

The report says that the problem of "faithless scientific personnel in this country appears to be markedly less grave than the public has been led to suppose." And, it is added, it's harder to give away a scientific secret than most people realize.

Fewer scientists need to be given security clearance, the committte urges.

The President's loyalty order needs "a drastic revision," the AAAS group charges.

Arguing that present laws already protect the government from employees who advocate its overthrow, the report contends that the order is "superfluous."

"The cost (of continuing the loyalty order) will in the end be borne not by the employees who are deprived of their normal freedom to believe and behave as they wish within the limits law has set. It will be borne by the nation as a whole," the committee concludes.

Science News Letter, August 27, 1949

ZOOLOGY

Tail of a Running Lizard Serves as a Balance

➤ BASILISKS, which are large lizards from the American tropics, rise up and run on their two hind legs when they are in a real hurry. There is a temptation to describe the basilisk as the lizard that runs like a man; but this would not be quite accurate. There are some rather wide differences in the two modes of bipedal movement, Dr. Richard C. Snyder, now of the

HIGH-TAILING LIZARD—Running basilisk lizard springs clear of the ground as it hits the top of its stride, upflung tail balancing forward-thrust body.

University of Washington, discovered when he analyzed highspeed motion pictures taken for him by Dr. A. A. Allen of Cornell University.

A running man swings his legs straight back and forth, but the running basilisk flings his legs out sidewise in a wide arc, more like some of the fancy steps seen in a ballet or in figure-skating, Dr. Allen found. This relatively less efficient type of motion, apparently dictated by the lizard's anatomical structure, makes its high speed all the more remarkable—for the basilisk moves like the proverbial blue streak when it feels the urge for speed.

When it is walking at leisure the basilisk goes on all fours, using its shorter and comparatively feeble forelegs. Sometimes it squats, kangaroo-fashion, on its hindlegs and long tail. But on a split second's notice it can break from a dead standing start into its lightning-like two-legged run.

When it reaches top speed, it is clear of the ground for a short part of each stride, thrusting itself into the air with the final push of its toes and catching its weight on the partly flexed opposite hindleg as it comes down.

The basilisk's long, heavy tail is an important organ in its running, Dr. Snyder discovered. Normally, as it picks up speed, it lifts its tail high, balancing its forward-thrust body.

The balancing function of the tail was strikingly demonstrated when a third of its length was surgically removed from one of the animals. The luckless lizard tried to break into its normal two-legged run, but after only one or two strides had to flop forward. When two-thirds of the tail was removed the performance was even poorer. A full-length tail therefore seems indispensable to the running basilisk.

Science News Letter, August 27, 1949

ENGINEERING

New "Electronic Brain"

➤ FINAL wraps were removed by the Eckert-Mauchly Corporation from what is said to be the world's second all-electronic automatic computing machine. The new device is smaller in size in comparison with its 30-ton parent, but faster in operation. Its speed and accuracy, 12,000 times faster than a human being, was demonstrated in Philadelphia to a group of scientists and representatives of the press.

The new calculator stands five feet high, four feet long and one foot wide. With its accessories, however, it requires a much larger space. It has been named BINAC, because it uses a binary system. The only other all-electronic computer is the ENIAC, short for Electronic Numerical Integrator and Computer. BINAC was built by the same men who designed and constructed its predecessor for the U. S. Army in 1946. This first BINAC was built for Northrop Aircraft, Inc., Hawthorne, Calif., which will be the first private concern to acquire an "electronic brain." A crew from the California company is now in Philadelphia to learn how to operate the device and keep it in working condition.

Actually twin computers, BINAC has duplicate arithmetic channels so it can check itself at every step. It has also two mercury tube "memories." These hold electric pulses until needed. Each twin of the BINAC has only 700 vacuum tubes, while the ENIAC has 18,000.

At the demonstration there, numbers were selected at random. These were typed on a small keyboard having only eight keys. The BINAC used coded instructions from a magnetic tape to deal with these numbers. Square and cube roots are calculated by it in a fraction of a second.

A human being with pad and pencil can find a square root correct for eight or nine digits in six minutes. With a desk calculator he can do it in two minutes. The BINAC does it in one-sixtieth of a second.

The demonstration at the Eckert-Mauchly Computer Corporation factory was given by Dr. John W. Mauchly and J. Presper Eckert, Jr., the inventors. As explained by them, BINAC operates in the binary system instead of the decimal one, and distinguishes between zero and one. It has to convert automatically to the binary before beginning any calculations and reconverts back again to get its answers printed out on an electric typewriter. Actually, the computer receives and puts out figures in the octal system, from zero to seven, as this converts more easily to binary than the decimal system does.

The main reason for the smaller size of BINAC is the mercury memory tube invented by Mr. Eckert. It replaces about 17,000 vacuum tubes used in ENIAC, and can store 15,000 binary digits. Electrical pulses, representing numbers and instructions, are sent through the mercury tube at a rate of 4,000,000 per second. They are held in the column by being rerouted through it as long as necessary. It is the tremendous speed of the mercury memory that makes it possible for BINAC to handle a great volume of data.

A larger, more general-purpose type of computer named UNIVAC is also being readied by the Eckert-Mauchly company. One is to be used by the National Bureau of Standards in Washington, and another by the Prudential Insurance Company of America.

There are earlier giant computer machines than the ENIAC and BINAC that are able to solve complicated mathematical problems, but they are not all-electronic. Harvard's Mark I and II, the huge device of International Business Machines Corp., and the Bell Telephone Laboratories relay computer, might be mentioned. There are now other all-electronic computers under development, particularly at Harvard, Massachusetts Institute of Technology, Princeton and the University of Pennsylvania. First place, however, is claimed for ENIAC and BINAC.

Science News Letter, August 27, 1949

ENGINEERING

"Daily Diary in Dust" Written by New Device

➤ A SIMPLE device developed at the atomic energy project on the Los Angeles campus of the University of California writes a "daily diary in dust."

The instrument is used to determine air-borne contaminants and to what extent air in a given area is contaminated. Based on a continuous jet impaction method, it utilizes a jet tapering to a fine slit, through which air samples are drawn. Particles in the air sample are deposited on a revolving glass disk. The disk can be calibrated to collect samples continuously over any desired period of minutes, hours or even up to a week.

The device is so sensitive that it will collect ash deposits from burning buildings within a five-mile radius, detect evidence of personnel in the area from the slight amount of dust stirred up, note meteorological changes and record many other events which agitate particles in the air.

All these occurrences are so precisely recorded that the time they happened can be accurately determined from the deposits on the disk.

Dr. Benedict Cassen, Dr. F. A. Bryan, Leonard Baurmash and Lawrence Curtis of the U.C.L.A. medical school atomic energy project developed the new device.

Science News Letter, August 27, 1949

GENERAL SCIENCE

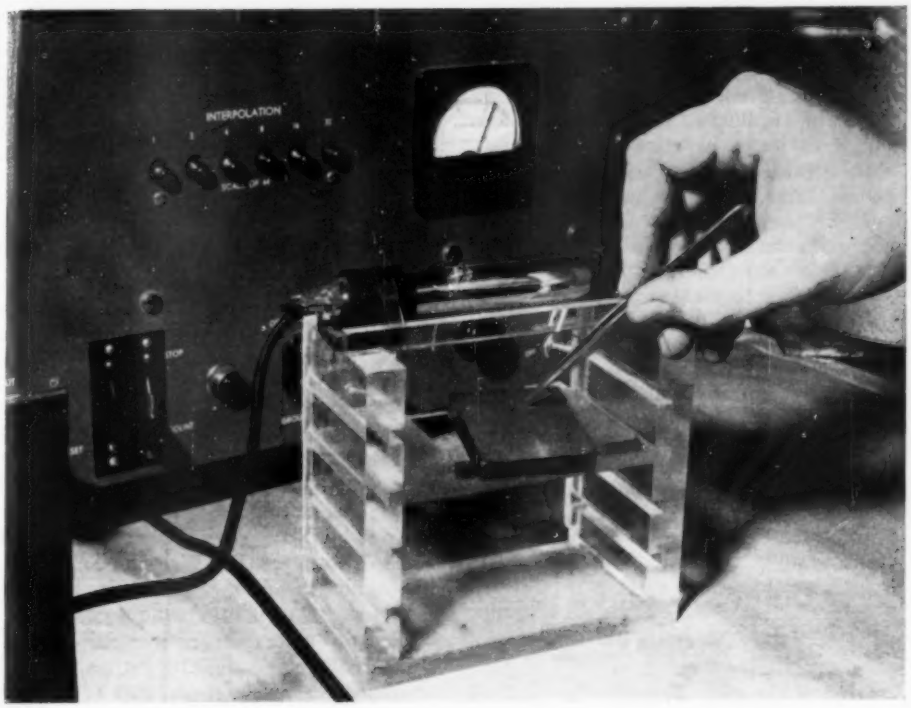
UNESCO To Promote World Exchange of Publications

➤ INTERNATIONAL exchange of publications will be aided by the publication in Paris this year of a manual on the subject, prepared by the United Nations Educational, Scientific and Cultural Organization.

Included will be a list of institutions throughout the world which are willing to exchange publications, and UNESCO officials are appealing to all institutions for information which can be used in the list. The institutions will include libraries, universities, scientific institutions and learned societies.

Information on institutions and publications available for international exchange is desired by the UNESCO Clearing House for Publications in Paris.

Science News Letter, August 27, 1949



RUST-CONTROL STUDY—Progress and destructive effect of the radioactively-coated rust patch being pointed to by the tweezers will be revealed on a photographic plate to be placed over the metal. The Geiger counter, glass tube above the metal square, picks up the radiations.

DENTISTRY

New Tooth Decay Theory

Those cavities in your teeth may be due to bacterial enzymes which release sulfuric acid from the protein in teeth, English scientist suggests.

A NEW theory that sulfuric acid in your teeth causes cavities when it is set free by chemicals unleashed by germs has been proposed by an English scientist.

Dr. P. Pincus of the physiology department, Medical School, Middlesex Hospital, writing in the BRITISH MEDICAL JOURNAL (Aug 13), explains that in enamel and dentine, the bone-like tissue below the enamel, is a protein containing sulfuric acid. Germs known as Gram-negative bacilli are present in the mouth, and secrete an enzyme called sulfatase. Chemical reaction between tooth protein and the enzyme sulfatase releases the pure sulfuric acid which then attacks teeth and causes decay, the theory holds.

In support of his new theory, Dr. Pincus points out that there are tiny grooves or cracks at the tips of teeth. When teeth first erupt they are covered by a fine layer of protein. This is worn off on the crowns by eating but since the cracks are narrow it remains in them. This site is thus a very favorable place for the chemical reactions to take place. Previous experiments have proved that the grooves are the most common place for decay to start.

A crack in the enamel-armor of the teeth which is not completely closed would be a minute avenue of entrance for bacteria to the dentine. Here the same chain of events could occur by the formation of bacterial enzymes reacting with the store of protein inside the tooth to burrow from beneath and cause decay.

Dr. Pincus refutes the idea that lactic acid formed by bacterial action is responsible for this decay at the bottom of the groove. Even if food particles are deposited in these grooves and thus form the site for lactic acid formation, the decay would occur on the sides of the groove rather than at the bottom because this has a plug of protein protecting it.

He concludes that tooth decay is not due to any bacillus but to certain bacterial enzymes which can release the sulfuric acid from the protein in teeth. Further study is needed to find out how the bacilli produce these enzymes and make them active.

Science News Letter, August 27, 1949

ENGINEERING

Rust Problems Studied With Radioactive Isotopes

➤ THE iron rust problem is being tackled by General Electric scientists with the help of radioactive isotopes from the Oak Ridge, Tenn., laboratories. The rusting action is photographed by X-rays from a radioactive surface.

In the study, a solution containing radioactive iron is electroplated onto the surface of the metal to be examined. Then a photographic plate is placed against this surface and left for several days. During this time, an X-ray exposure is made on the plate by the radioactive coating. As the test metal rusts, a decrease in radiation results, showing up graphically on the photographic plate as lighter areas.

By taking a series of these pictures, called autoradiographs, the scientist can see photographically the nature of the rust forming on the test metal. It is expected the photos will help show how rust starts, where it starts, and how deep it goes.

Science News Letter, August 27, 1949

CHEMISTRY

England Wants To Improve Detergents from Petroleum

➤ WITH the use of cleansing synthetic detergents from petroleum firmly established in the British textile and other industries, intensive studies are to be continued in that country with the objective of developing better products and methods. The results will help relieve the world shortage of vegetable and animal fats for soap.

British work in making these detergents was explained to the United Nations Scientific Congress on the Conservation and Utilization of Resources, held this month at Lake Success, N. Y., by F. Mackley, Shell Refining and Marketing Co., Ltd., Cheshire, England. He reviewed the petroleum refining industry in the United Kingdom, showing the predominance of specialized refining for lubricating oils and bitumens as well as detergents.

There is little crude oil mined in England, although the so-called Eakring field has reached a production of some 70,000 tons a year. This crude yields high quality lubricating oil and wax distillates.

Crude oil, however, is imported in quantities of several million tons annually and refined in domestic plants. The industry is currently dominated by the very considerable expansion of general refining facilities which is now taking place, according to Mr. Mackley. Certain refineries are to devote their activities to petroleum chemicals, including aliphatic alcohols and ketones, acetone, glycols, aromatic hydrocarbons, solvents and plastics.

Science News Letter, August 27, 1949

WILDLIFE

Ibex Being Re-Established In Germany, Austria

➤ THE IBEX, heavy-horned wild goat of the Alps, is being re-established in the mountains of Germany and Austria, where it was exterminated by overhunting many years ago, states Dr. Lutz Adolf Heck, Munich zoologist, in the German scientific journal, ORION (July). A good beginning has already been made in Switzerland.

The start for the new ibex population of the Bavarian Alps was made by penning a small colony of the animals in a special high-walled enclosure near Berchtesgaden, Hitler's old playground. Some of them came from the great zoological garden of Hellabrun, near Munich. Zoologists in charge kept up the program even during the war.

By 1944, the colony had grown to 27 head, including a number of kids that had been born in the enclosure. Half of the animals were liberated then, and the remainder shortly after the end of the war. Some of the ibex have been seen from time to time, and prospects for the re-establishment of this element in the natural fauna of the Alps seem hopeful.

Medico-magical superstitions were partly responsible for the extermination of the ibex population of the Swiss, Austrian and German mountains in early modern times. Wild ideas prevailed regarding the powers of bezoar stones, which are hardened hairballs sometimes found in the animals' stomachs, and of a cross-shaped bony concretion from the heart region. Such extravagant prices were paid for these objects that protective legislation was disregarded by the black-market hunters.

Science News Letter, August 27, 1949

CHEMISTRY

Oil Wells Yield Nearly Half of Our Iodine Supply

➤ NEARLY half the 1,500,000 pounds of iodine used annually in America now comes from oil wells, INDUSTRIAL AND ENGINEERING CHEMISTRY, a publication of the American Chemical Society, says. The iodine is obtained from a brine that comes up with the oil.

Obtaining iodine from oil-well brine is not new. Its first recovery from this source was in 1926 in Louisiana. Oil wells on the West Coast, however, are now supplying the widely used chemical in large amounts, decreasing greatly the amount that must be imported.

The chief use of iodine is as a germicide. It is a familiar medical for cuts and bruises in many households. It is also used as a vital element in cattle feed, in photographic films and in dyes. It is used in methyl iodide, one of the newer gases employed in fire extinguishers, and in a number of other important iodine compounds.

Much of the iodine used in the United States comes from Chile, where it is found as an impurity in saltpeter. Some comes from Japan where it is obtained from the ashes of seaweed. There is considerable iodine in ordinary seawater, but not enough to make its recovery economical.

In the process of recovering iodine from oil-well brine, the chemical is literally blown out of the oil brines in huge towers built with acid-proof bricks, this article states. It is then captured from the air and solidified. The report, prepared by Frederick G. Sawyer, of the Industrial and Engineering Chemistry staff, in collaboration with M. F. Ohman and Fred E. Lusk of the Dow Chemical Company, asserts that sufficient quantities of oil-field brine are available in this country so that in an emergency the entire iodine requirement could be obtained from domestic sources.

Science News Letter, August 27, 1949

PHOTOGRAPHY

Early Camera Will Be Displayed at Museum

➤ ONE of the earliest cameras in the U. S. will be displayed at the photographic museum at George Eastman House, Rochester, N. Y., when the house is opened to the public in a few months.

The camera is one of the first Daguerre cameras sold in this country. It was sold to Dr. Samuel A. Bemis, a Boston dentist, by Francois Gouraud, April 15, 1840. Gouraud was agent in the U. S. for the famed Louis Jacques Mande Daguerre, inventor of the daguerreotype. Dr. Bemis paid $51 for the camera.

In addition to the camera, the museum will also exhibit the bill of sale and Dr. Bemis' first picture, a view of King's Chapel Burying Ground in Boston.

"Even to our eyes," declares Beaumont Newhall, curator of Eastman House, "it is a good photograph."

Science News Letter, August 27, 1949

AGRICULTURE

Fluorescence May Help Solve Soil Problems

➤ FLUORESCENCE, the visible light given out by some substances when irradiated with invisible ultraviolet light, may become a useful tool in the scientific study of soils. This suggestion is offered by Prof. P. H. Gallagher of University College here, in a letter to the editor of the London science journal, NATURE (Aug. 13).

Prof. Gallagher has done some preliminary work along this line. He reports that humus in its most advanced stage has a yellow fluorescence, and that a waxy substance sometimes found in mucky soils fluoresces bluish-white. Living things found in the soil, such as earthworms and young roots, have their own specific modes of fluorescence.

Science News Letter, August 27, 1949

IN SCIENCE

BIOCHEMISTRY

New Vitamin Factor In Yeast Discovered

➤ A NEW vitamin factor has been isolated from yeast by cooperative efforts of scientists in research laboratories of Sharp and Dohme, Philadelphia, and Merck and Co., Rahway, N. J. The vitamin, called biocytin, was announced by Dr. Lemuel D. Wright of Sharp and Dohme at the First International Congress of Biochemistry in Cambridge, England.

No medical use for the new vitamin factor is known yet, Dr. Wright pointed out, but clinical studies to determine its role in human metabolism are now under way.

Biocytin occurs in nature only in infinitesimal amounts. Yeast extract, with a concentration of about one part of biocytin per million of dry matter, was selected for the isolation work.

Thus far, more than eight tons of yeast extract have been processed since isolation work began and less than a thirtieth of an ounce of the pure material has been produced.

Participating in the studies besides Dr. Wright were E. L. Cressen and H. R. Skeggs, of Sharp & Dohme, and Drs. Karl Folkers, T. R. Wood, R. L. Peck and D. E. Wolf, of Merck.

Science News Letter, August 27, 1949

BOTANY

"Bachelor" Honey-Locust Desirable as Street Tree

➤ A "BACHELOR" honey-locust tree, which bears male flowers but no female ones and hence produces no seed-pods, has been bred by John D. Siebenthaler of Dayton, Ohio. Absence of seed-pods is considered desirable when this tree is planted as a street tree, since the heavy crops of pods borne by ordinary honey-locusts mess up pavements and parkings and require a great deal of raking and sweeping to clear away. The tree has the further advantage of being wholly without the long, branching, needle-pointed thorns that make most honey-locusts a fair plant-kingdom equivalent of porcupines.

Mr. Siebenthaler describes the growth-habit of his tree as "vase-shaped". This is the shape that has long made the American elm a favorite for street planting. The tree can be propagated by grafting or by hormone-treated cuttings.

U. S. plant patent 836 has been issued on this thornless, podless honey-locust.

Science News Letter, August 27, 1949

E FIELDS

GENETICS

Study of Freak Births in Mice May Help Humans

➤ STUDY of freak births of genetic origin in laboratory mice will, it is hoped, eventually help to prevent or at least remedy similar occurrences in human babies, Prof. L. C. Dunn of Columbia University stated at the celebration of the twentieth anniversary of the Jackson Laboratory in Bar Harbor, Me.

Most such abnormal developments result from mutations, or sudden evolutionary shifts, Prof. Dunn told his audience. They include such things as forked tails, no tail at all, harelip, cleft palate, and "dead end" digestive systems. One such mutation, loss of the tail, may explain what is now the normal condition in man and the higher apes, the speaker pointed out; but some of the others are far from being matters of self-congratulation. Babies with closed digestive tracts invariably die soon after birth, so that study of the heredity of this fatal trait in human beings is not possible. However, since mice reproduce much faster and in larger numbers, it is possible to make parallel genetic studies on mouse families showing the same trait, with some hope of eventually obtaining data useful in human applications.

Sometimes non-hereditary changes arise which exactly resemble those due to hereditary causes, Prof. Dunn continued. Such non-hereditary changes are known as phenocopies. Study of phenocopies, and of the environmental factors that may have helped to produce them, often throws light on their hereditary "opposite numbers".

Science News Letter, August 27, 1949

PLANT PATHOLOGY

New Disease Is Killing British Sycamore Maples

➤ A NEW fungus disease is killing sycamore maples in England, and plant pathologists are on the lookout for its possible appearance in this country. The sycamore maple is native to the Old World, but is used in Washington, D. C., to a considerable extent as a shade tree.

The fungus works its way in between bark and wood. Eventually the bark peels off, leaving a dark, velvety surface exposed. The velvety appearance is due to billions of deep-brown spores, which float through the air to spread the disease farther. When the fungus has worked its way all around the trunk, girdling the tree, death ensues.

The disease has been under observation in England since 1945, but is given its first description in the London scientific journal, NATURE (Aug. 13). The report is presented by P. H. Gregory of the Rothamsted Experimental Station, T. R. Peace of the Forest Research Station at Wrecclesham, Surrey, and S. Waller of London.

The causal fungus has not yet been identified, and it may be a hitherto unknown species. The report states that the disease has some resemblance to one disease of American hard maples and another of the London plane or sycamore cultivated in the United States. The causal fungi of both these diseases have been identified.

Science News Letter, August 27, 1949

MEDICINE

Involuntary Sterility of One Year Needs Treatment

➤ ONE YEAR is long enough to wait before seeking treatment for sterility if a couple has discontinued birth control and still does not have a baby, a team of Baltimore doctors conclude from a study of 2,000 expectant mothers.

This applies to families using birth-preventing methods who wish to space the birth of their children over a two- or three-year period. The common practice at present is to wait two or three years before the physician will attempt remedial measures.

The report by Drs. Alan F. Guttmacher and Dr. Samuel Rubin of Johns Hopkins University School of Medicine and of the Sinai Hospital, Baltimore, and Dr. Christopher Tietze of the National Committee on Maternal Health, Inc. appears in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Aug. 20).

Their suggestion is based on the results of the study which showed that three-fifths of the patients became pregnant within three months of their decision to have a baby. And 90.8% were pregnant within the first year after birth control was discontinued.

Not all of these were wanted babies. The physicians pointed out that 374 or 18.7% of the pregnancies were due to failure of the birth control methods. This, they warn, may not be a true picture of the situation since it is impossible to determine how many of these women will have abortion or will not come to the physician.

Moreover, the figures are somewhat distorted by the fact that there are many couples who practice birth control successfully throughout their married life and it is impossible to make a statistical study including them.

In this group 1,653 women became pregnant who had previously used contraceptives. In over 85%, the condom and diaphragm were the methods practiced for birth control. The physicians concluded that these two methods were the most effective of any of those used.

Science News Letter, August 27, 1949

MEDICINE

Twins May Prove Ulcer Predisposition Inherited

➤ THE possibility that a predisposition to peptic ulcers is inherited is to get further scientific investigation in the study of twins.

Dr. A. C. Ivy of the University of Illinois, in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Aug. 20), appealed to doctors to send him reports of twins in which one or both had peptic ulcers.

He pointed out that twins have in the past helped to establish the fact that predisposition to tuberculosis, diabetes, tumors and intelligence are inherited.

So far, there are only six cases of peptic ulcer in twins on record. He is certain there are many that are not reported since twins are born in one of 86 births and identical twins in one of 344 births.

Dr. Ivy hopes to receive further evidence from practicing physicians, which might help to support this theory.

Science News Letter, August 27, 1949

CHEMISTRY

Turning Negroes White by Chemical Is Impractical

➤ THE scientist who first investigated over a decade ago the strange phenomenon of Negroes turning white, is authority for the fact that the chemical treatment, given publicity in a national magazine, is impractical and dangerous.

He is Dr. Louis Schwartz, a retired skin specialist of the U. S. Public Health Service living in Washington.

He recalled that Negroes in a tannery at Waukegan, Ill., found that their arms and hands were turning white. The cause was traced to a hydrocarbon in the rubber gloves they wore.

This effect has been the subject of hope exploited many times that the color line might be broken, but applications on the skin are slow and patchy and not satisfactory. No one has dared take the chemical internally, as it would have to be administered to produce a uniform effect, because the chemical is poisonous.

The chemical, the monobenzyl ether of hydroquinone, is a bleach that is used as a preventive of oxidizing of rubber (trade name Age-Rite-Alba). It bleaches not Negro skin alone, but any dark pigment. It has been used medically to bleach liver spots on white people.

Dr. Schwartz recalls that when it was proposed to feed the chemical to Negroes experimentally he could not secure any suitable volunteers.

It takes a month or two to produce the local bleaching of skin and the effect produced is a deathly white, which may nevertheless be spotty.

Science News Letter, August 27, 1949

ASTRONOMY

Equinox Brings Fall Stars

Jupiter and Venus will be the only planets visible in the September evening sky. Vega will be the brightest star to be seen in the evening.

By JAMES STOKLEY

➤ THE MONTH of September brings, on the 23rd, the autumnal equinox. This comes at 4:06 a. m., EST, the moment that the sun is directly over the earth's equator. For us in the northern hemisphere this is the beginning of autumn, though people in southern countries know it as the beginning of spring. In the evening sky the ever-changing constellations show us that this event is at hand, as groups that were conspicuous during the summer disappear, while others which will become more prominent during the fall and early winter have now become visible.

Jupiter and Venus continue in September to be the only planets visible in the evening sky—and only Jupiter is to be seen throughout the evening. It shines brightly in the constellation of Saggitarius the archer, low in the south for the times to which the accompanying maps have been prepared. These show the aspect of the heavens at about 10:00 p. m., your standard time, and an hour earlier at the middle of September. (Add an hour if you are on daylight time.) Jupiter has a magnitude on the astronomer's scale of minus 2.1, which makes it more brilliant than any nearby star, so it is easy to locate

Venus Near Horizon

Venus is even brighter, of magnitude minus 3.5, but you have to look to the southwest, near the horizon, just after the sun has gone down, in order to see it. Since last April 16, when it passed the sun, it has been moving eastward through the sky. But at the same time it has been getting farther and farther south, and that is why, even though it has been drawing away from the sun, it still has not gotten higher in the evening sky. In countries of the southern hemisphere, however, it has now reached great prominence, as it will do for us by the end of the year.

Venus and Jupiter are both planets—bodies like the earth that revolve about the sun and shine by the sunlight they reflect to us. Of different nature are the stars, which are distant suns, shining by their own luminosity. Vega, high overhead these evenings in the constellation of Lyra, the lyre, is the brightest now visible. Also overhead is Cygnus, the swan, with brilliant Deneb, and nearby, toward the south, we can see another star of the first magnitude, which is Altair, in Aquila, the eagle. In the same region, just below Lyra in the west, is the large constellation of Hercules. Though it does not contain any stars of the first magnitude, it is easily recognized. Six of the principal stars in the group outline the shape of a butterfly.

The other first magnitude stars shown on the maps all happen to be near the horizon. Low in the northwest is Arcturus, in Bootes, the bear driver, which is just to the left of the familiar "great dipper," part of Ursa Major, the great bear. Farther to the right, low in the northeast, one may see Capella, in Auriga, the charioteer. During the coming months, this group will rise higher into a more prominent position, while Bootes is soon to disappear from the evening skies.

Fomalhaut in South

Making its brief autumn visit to the evening heavens, Fomalhaut, in Piscis Austrinus, the southern fish, can be observed low in the south. It is just below the constellation of Aquarius, the water-carrier, with which it is associated in fable. The old star maps, which showed the imaginary figures that the star groups were supposed to depict, represented Aquarius as an old man, holding a jar from which water was flowing, into the mouth of the southern fish! This is a rather watery part of the sky, because to the left of Piscis Austrinus is Cetus, the whale, and above him are two more fishes, in the constellation of Pisces. This group, by the way, extends below and to one side of the "great square," an easily recognized part of the constellation of Pegasus, the winged horse.

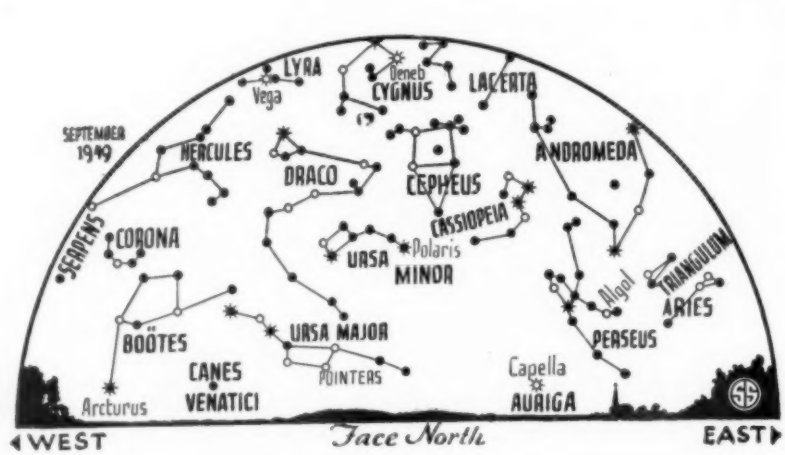
Only one other planet, in addition to Jupiter and Venus, can be seen during the night in September. Mars, now in Cancer, the crab, rises in the east several hours before sunrise. It is approaching but is still quite distant, and appears of the second magnitude, though its red color wil help one to find it.

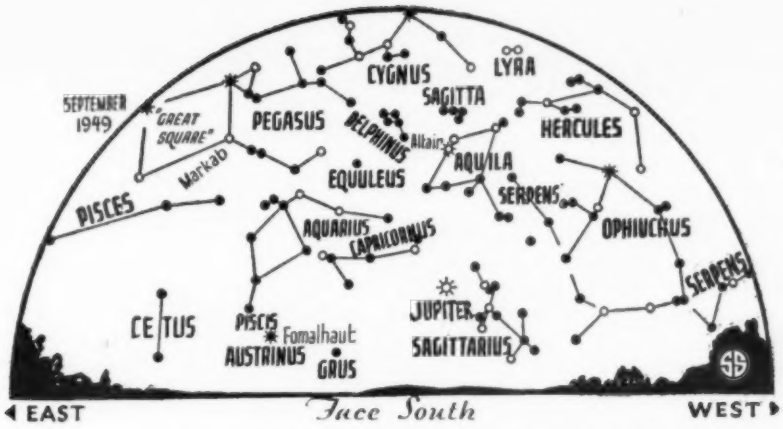
The constellation of Lyra, high in the west, has other points of interest, in addition to containing Vega, brightest star of the summer evening. If you look closely, you can see two fainter stars near it, toward the west, all three forming an equilateral triangle. The northernmost of these companions is called epsilon Lyrae, and if you have very keen eyes, or if you look at it through binoculars, you will see that it is really two stars. Through a still larger telescope, like those used by astronomers, each of these stars is also shown to be two. Thus, epsilon Lyrae is often called the "double double."

To the southeast of Vega, about three times as far as the epsilon and the other of the companions mentioned above are two more stars of the same constellation, known as beta and gamma Lyrae. Between them is a very interesting object, unfortunately not visible to the naked eye, which looks like a smoke ring when seen through a telescope. This is called the ring nebula in Lyra, and it is an example of a planetary nebula of which about 150 are known. This name is given not because they have any real relation to planets, but it was assigned by Sir William Herschel, great English astronomer of the 18th century. As he, and other early observers, scanned the heavens with their telescopes, they came across these objects, and were struck by the fact that they looked very much like the images of the planets.

Glowing Gas

The "ring" nebula is not really a ring, but a shell of glowing gas. The ring appearance comes from the fact that the globe is translucent, and we see a greater thickness of gas at the edge than at the front or back. However, these gases are extremely rarefied. Two astronomers, Leo





☼ ✷ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

Goldberg and Lawrence H. Aller, have illustrated this in a striking way in their excellent book, "Atoms, Stars and Nebulae." They ask you to imagine an ordinary tumbler filled with hydrogen at room temperature and pressure, to which is added a thimbleful of air and a few dust particles. If the glass were sealed, and then enlarged until it was as high as Mt. Everest and some two miles in diameter, the expanded contents would then represent a fairly accurate sample of a piece of a planetary nebula. Thus such a nebula is really a very high vacuum, better, in fact, than the best that can be secured in our terrestrial laboratories. The fact that they are so vast, averaging in diameter around a million million miles— more than 10,000 times the distance from earth to sun— means that they still contain enough atoms excited to luminescence that they can be observed.

At the center of the "ring" nebula, as with many of the planetaries, there is a star which cannot be seen even with large telescopes but which shows up plainly on the photographs. Such stars are very hot, with a surface temperature about 10 times that of the sun and shining mainly with invisible ultraviolet rays. When these rays strike the atoms of gas, they cause temporary changes in the positions of the electrons of these atoms. As these displaced electrons fall back into place, they give off energy in the form of light. This is the same as the familiar effect on earth known as fluorescence so these nebulae are actually shining by the same sort of process as that of the fluorescent electric lights which have become so popular in recent years.

Time Table for September

Sept.	EST	
2	5:00 a. m.	Saturn in line with sun
	11:29 p. m.	Moon passes Jupiter
7	4:59 a. m.	Full moon
	6:00 p. m.	Mercury farthest east of sun
10	6:00 a. m.	Moon farthest, distance 252,200 miles
15	9:29 a. m.	Moon in last quarter
18	4:56 p. m.	Moon passes Mars
22	7:21 a. m.	New moon
	11:00 p. m.	Moon nearest, distance 222,400 miles
23	4:06 a. m.	Sun over equator, autumn commences in northern hemisphere, spring in southern
25	5:17 a. m.	Moon passes Venus
28	11:18 p. m.	Moon in first quarter
30	4:46 a. m.	Moon passes Jupiter

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, August 27, 1949

AERONAUTICS

Gadget Prevents Swaying Of Plane's Tail in Flight

➤ A GADGET to take the "Dutch Roll" out of speedy airplanes in flight was revealed by the Boeing Airplane Company. It holds the tail of the plane from swaying to right or left when side-swiped by sudden gusts of air. Its "brain" is a gyroscope out of an E-6 automatic pilot. Experimentally, it is in use on a Boeing speedy Stratojet, a plane with sweep-back wings in the 600-miles-per-hour class.

So-called Dutch Roll is not a very common occurrence, and seldom shows up until a plane is undergoing flight tests. It can be corrected by a design change, but such alteration might affect the speed. The term was applied because a plane going through the Dutch Roll looks like a Dutchman ice-skating on a Holland canal.

The gyroscope is supplemented by a turbosupercharger amplifier and a turbo waste-gate motor. The first two are on the frame of the plane, the motor is on the push rod that is used to move the plane's rudder to the right or left. When a side gust strikes the tail of the plane, the automatic gyroscopic device senses it immediately and pushes or pulls the rudder to right or left before the gust causes the plane to swerve.

Science News Letter, August 27, 1949

BLACK LIGHT

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NUCLEAR PHYSICS

Plan New Atom-Smasher

➤ A 70,000,000-volt synchrotron, one of the newest of atom-smashers, soon will be brought into the fight against cancer.

Such a machine has been ordered for the University of California Medical School at San Francisco. It will be financed by the Atomic Energy Commission and constructed by the General Electric Company.

The machine will be used to explore thoroughly the indications that very high energy radiations go through normal tissue without doing much harm to them, and have nearly all their effect deep in the body.

Experiments with X-rays up to 20,000,000 electron volts have already demonstrated that this happens. Scientists feel that this principle offers great promise in the treatment of deep-seated cancers, in which one of the greatest problems is to destroy the cancer without killing the normal cells essential to the patient's well-being.

Only recently have suitable machines of high enough energy for this purpose become available. They are a product of postwar atom-smashing developments.

The director of the research program for the new machine will be Dr. Robert S. Stone, noted professor of radiology at the University's Medical School and wartime head of some of the important health and safety phases of the atomic bomb project.

The new concept has been demonstrated in animal experiments using X-rays produced by betatrons up to 20,000,000 electron volts. The new synchrotron will be the first such machine applied to this work, and it will be capable of adjustment to any energy between 5,000,000 and 70,000,000 electron volts.

Because the concept is still in the experimental stage, Dr. Stone will begin work with animals. Human applications will be made as soon as the animal experiments warrant.

The project, including the machine and building to house it, will cost about $445,000. Completion is scheduled for 1951.

Science News Letter, August 27, 1949

MEDICINE

Foresee End of Malaria

➤ ONLY a depression will keep malaria from being wiped out in the United States in the next ten years, Dr. Ernest Carroll Faust of Tulane University School of Medicine predicted to the National Academy of Medicine of Mexico.

The tropical disease expert credited the present decline in the disease to attack on the parasite causing it and the anopheles mosquito which carries the parasite. The disease would be wiped out with the elimination of either the parasite or the carrier and this "appears near at hand," he said.

Danger lies in overconfidence or neglect to carry out the control program, he pointed out, for then malaria might gain a foothold again. A depression might foster such an attitude, Dr. Faust stated, pointing to the one in the 1930's, when drainage projects were neglected and the poor did not have enough money to buy food, clothing, medicine, or get decent housing.

That malaria has been reduced to less than 100 deaths per year today as compared with nearly 5,000 per year during 1933-1935, Dr. Faust felt, was due to the government employing men out of work for sanitation projects; improved eating habits that raised resistance to the disease; better medical care and use of new drugs such as atabrine; and better housing, with screens to keep out mosquitoes and pyrethrum sprays to kill those that got in.

The returning soldier with malaria proved to be no threat to the health of the people, Dr. Faust stated. There were only one or two instances where civilians acquired the disease by transmission from infected soldiers. The fear of widespread infection was needless, he declared, because of the great reduction in mosquito breeding which had occurred a decade or so ago.

Science News Letter, August 27, 1949

AERONAUTICS

Fast Flight Temperatures Threat to Aluminum Alloy

➤ HIGH temperatures resulting from supersonic flight of airplanes appear to be the only important threat to the supremacy of aluminum alloy in aircraft construction, the Anglo-American joint aeronautical conference in New York was told by G. G. Green, Consolidated Vultee Aircraft Corporation, San Diego, Calif. These high temperatures are due to the friction between the air and the plane, and they become excessive at high speeds.

High-strength aluminum alloy is observed not only to be maintaining its position as the major structural material but also to be invading fields previously considered the province of steel, he said. At temperatures above 200 to 250 degrees Fahrenheit, the use of these alloys becomes doubtful. Stainless steel and what is known as Inconel X are among the best choices at 300 degrees and higher. Titanium shows great promise in the range of temperatures to be encountered by aircraft flying at supersonic speeds, but it is still relatively new as a structural material.

The successful use of magnesium alloy in the structure of several current aircraft is noted as an indication of probable wider use of this material in applications not involving high temperatures.

Wing construction was also discussed by Mr. Green. The new delta wing, he said, is a logical solution of the problem of aircraft with performance extending into the supersonic range. This type of wing, already under flight test, is a triangular surface with equal sides, with the fuselage of the plane extending from the center of one side forward and beyond the opposite apex. It is an extreme swept-back construction, with the leading edge of the wing at an angle of only 30 degrees with the center line of the body of the plane.

The life of airplane structures was discussed at the same meeting by H. A. Willis of the Australian Council for Scientific and Industrial Research. His conclusion was that the factors involved are numerous, complex and interrelated, and that enough about them may never be known to make precise estimates of safe operating life. However, a thorough study of them will lead to sounder and more efficient design that will be reflected in fewer failures in service and greater safety.

Science News Letter, August 27, 1949

ORNITHOLOGY

Yellowstone Swan Census Shows Substantial Gain

➤ THE trumpeter swan, America's largest, most majestic waterfowl, has gained another lap in its race against extinction. The annual swan census, just completed in Yellowstone Park by flying biologists of the U. S. Fish and Wildlife Service, shows a total population of 75 birds—54 adults and 21 cygnets. The census takers also found 15 swans when they flew over the wilderness country on the Bechler river just south of the Park, making a total of 90 for Yellowstone Park and immediately adjacent areas.

This is the highest number ever recorded in a trumpeter swan census, representing a gain of almost 50% in cygnets and 8% in adults. Last year's total count was 62, including cygnets. This year's census was taken two weeks earlier than last year's, so that the cygnet count may not be strictly comparable—this is an especially critical time for the young birds.

This year's census was the second made mainly from the air, with a certain amount of work done on foot near two lakes. The official biologist of Yellowstone National Park accompanied the Fish and Wildlife Service party as an observer.

Science News Letter, August 27, 1949

PSYCHIATRY

New Profession Pioneered

➤ A PIONEERING step toward a new profession was taken with the announcement of the fall opening of a new school which will teach psychiatry to mental hospital attendants, Dr. William C. Menninger, general secretary of the Menninger Foundation, Topeka, Kan., said.

The Menninger Foundation and the Topeka State Hospital will offer the teaching personnel and training for students. The program was made possible by a $70,500 grant from the Rockefeller Foundation of New York.

"This is perhaps the most significant program in psychiatry today," Dr. Menninger said. He pointed out that because psychiatric aides are in direct contact with patients, their newly-acquired knowledge will benefit the sick, and make them more competent team-workers with doctors and nurses.

Under the grant, the school is established for three years, divided into two six-month semesters for each year. Students will have a six-week rotation period between the Topeka State Hospital and the psychiatric hospitals of the Menninger Clinic. No fees will be charged, but students have to meet certain requirements because only 25 will be admitted every six months. Students must have, as a minimum, a high school education; be between 18 and 35 years of age; be free to be employed at the Topeka State Hospital; and have well adjusted personality and aptitude for leadership.

Classes will begin Oct. 1. Applications should be sent to Dr. Bernard H. Hall, director of the educational program, Menninger Foundation.

Idea for the new school originated two years ago among a group of psychiatric aides at Winter Veterans Administration Hospital. The Rockefeller Foundation contributed $5,500 to make a pilot study of the problem in 1947. The new program is based on the findings of this study.

Dr. Karl Menninger will be director of the new school. In addition to Dr. Hall, other staff members will be: Miss Esther Lazaro, R. N., staff of the Menninger Clinic, associate director; Ream A. Lazaro, administrative assistant; and Mrs. Paul E. Pollard, secretary.

Science News Letter, August 27, 1949

METEOROLOGY

Ocean Weather Stations

➤ THE locations of the ten weather stations to be maintained on the North Atlantic after July 1, 1950, for the benefit of air and surface ships on transoceanic routes have now been announced by the International Civil Aviation Organization at its headquarters in Montreal.

These ten ocean weather stations will replace 13 now in use. The new network is the result of a recent meeting of the 11 member nations most concerned, held in London earlier this year. The present agreement expires on June 30, 1950, and then the new agreement will go into effect.

Six vessel stations will be maintained by the United States, the nation most concerned, with the cooperation of Canada and The Netherlands in the case of two. One will be about midway between Labrador and the southern tip of Greenland, and another well off Greenland on the route to Iceland. Another is about midway between Newfoundland and Ireland, and a fourth located between Newfoundland and the Azores. The positions of the other two American vessels will be one well off the coast of North Carolina and the other far out in the Atlantic on the same latitude.

The two vessel stations of the United Kingdom are to the south of Iceland, the more southerly one being on the Newfoundland-London route. Still farther south will be a French station, while a Norwegian vessel will occupy waters to the west of that country.

A total of 25 vessels will be used to maintain these ten ocean-weather-reporting stations. The United States will provide 14 of them. Cooperating with the work of these floating stations, land-based stations in the United States, Canada, Greenland and Iceland will continue. Assisting also will be a loran station on the Faroe islands between Iceland and Scotland. Loran is a war-developed navigation aid that enables air and surface ships to get their true geographical position from two widely separated radio stations by means of direction finders that give the position relative to the two stations.

Science News Letter, August 27, 1949

GENERAL SCIENCE

Quest for Knowledge Urged in High Schools

➤ "A GREAT national quest for knowledge" to help the million or more high school boys and girls "eager to do things in science," was proposed by Watson Davis, director of Science Service.

These science-minded high school students and their teachers "need guidance, inspiration and materials with which to work," Mr. Davis explained at the twentieth anniversary meeting at the Roscoe B. Jackson Memorial Laboratory in Bar Harbor, Me.

"America needs a great national quest for knowledge—operating in the schools and kindling the sparks of interest and genius latent in our high school youth," he declared.

Foundations for a national quest, Mr. Davis added, have been built in Science Service's Science Clubs of America, which have 15,000 clubs and a third of a million members.

"For the future of America—for peaceful living, for industrial progress, for successful democracy, for a strong and prepared nation—the quest by youth, for science understanding, must be accomplished," the Director of Science Service urged.

Science News Letter, August 27, 1949

ENGINEERING

Shadow Photographs Help Measure Electrical Fields

See Front Cover

➤ SHADOW photographs made under the powerful magnification of the electron microscope can now be used to measure tiny electrical or magnetic fields, scientists at the National Bureau of Standards disclosed.

The new photographs will show the direction and strength of the fields of the minute "atomic magnets" within magnetic materials.

In addition to providing a new tool for fundamental research in physics, Bureau officials said that the new technique will aid studies of equipment used in radio, radar and television.

The new "electron-optical shadow method" was developed during experiments on the magnetization of magnetic recording wire by Dr. L. L. Marton of the Bureau's electron physics laboratory. A wire net of non-magnetic material is used to cast an electron shadow on the screen of the microscope. The electrons, tiny negatively-charged particles which are one component of atoms, are deflected by the magnetic force of any magnetic object under the microscope. A photograph of the microscope's fluorescent screen can be studied to reveal the direction and force of the field.

The magnetic field about a small horseshoe magnet, photographed by means of the new electron-optical shadow technique is shown on this week's cover of the SCIENCE NEWS LETTER. The screen of an electron microscope shows the electron shadow of a fine wire mesh which is superposed on the image of the magnet, distorted by the deflection of the electrons as they pass through the field of the magnet. The total width of the magnet is about one-fourth inch.

Science News Letter, August 27, 1949

BOTANY

NATURE RAMBLINGS

by Frank Thone

A Successful Family

➤ SUMMER, especially late summer, is the high burgeoning time for that great family of flowering plants that face the sun with myriad small images of himself, the Compositae. Sunflowers—half-a-hundred species of them—daisies, asters, goldenrods, compass-plants, coneflowers, blazing-stars, thistles, dandelions and scores of other bright flower-heads shine boldly back at the summer sky with the summer sky's own colors, gold and blue.

If numbers of species and variety of forms are criteria of success in the plant world, this is the most successful of all plant families. There are well over 13,000 described species, distributed among a couple of hundred genera. Members of the family flourish from the polar regions to the tropics, from swamps to deserts, from sea level to high alpine meadows.

Most of them are of non-woody, herbaceous habit; a moderate number are shrubs. Very few of the composites can be classified as trees, and these are only small trees, growing in restricted and mostly out-of-the-way parts of the earth. This predominance of the herbaceous habit of growth is again evidence of a high degree of evolution, in the opinion of many botanists.

The flower structure of a composite is baffling to all beginning students of plant life. Equipped with the basal knowledge of the "typical" flower's parts—sepals, petals, stamens and pistil—they are left floundering the first time they dissect a dandelion or a daisy.

The secret is that a flower of a member of the composite family is exactly what the name implies: a composite structure. It isn't a single, simple flower, but a whole society of flowers, quite small ones, crowded closely side by side. The Compositae are among plants what bees, ants and termites are among insects—societies rather than individuals.

If you will split up one of these flower heads, you will find that the unit of floral structure is a small seed-forming body or pistil, made angular through crowding, that sits tight on a flat or convex base, the receptacle. It is very likely to have five stamens packed into a close ring. There may be no petals at all, but if petals are present they form a one-sided, strap-like affair, as in dandelions or thistles. A trace of the original five-petaled structure may be seen in five points at the outer ends of this strap.

In many composite flower heads most of the tiny flowers (florets, to be learned about it) have lost the strap-like corolla and are crowded together in a central disk. A row of florets around the margin produce much-enlarged petaloid structures, usually called rays. This arrangement is typical of such plants as sunflowers, coneflowers and daisies. Often the ray-florets are sterile, producing no seed; their job is to entice insects to their unpetaled but fertile sister florets of the disk—a division of labor again suggesting the cooperative life of the beehive or the anthill.

Science News Letter, August 27, 1949

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ENGINEERING

Servo-Mechanism Control

➤ THE magnetic fluid clutch, a device using iron particles in oil developed by the National Bureau of Standards during the past year (*See SNL*, April 3, 1948, p. 211), has found an early application in a new, simple, automatic control for airplanes and other mechanisms, the control being known technically as a servo system.

This servo-mechanism is described in the REVIEW OF SCIENTIFIC INSTRUMENTS by E. S. Bettis and E. R. Mann of Oak Ridge, Tenn., scientists of the Fairchild Engine and Aircraft Corporation engaged on the so-called NEPA, or Nuclear Energy for Propulsion of Aircraft, project.

In this new magnetic clutch, for which Jacob Rabinow of the Bureau's staff is responsible, the fluid used is comprised of a carbonyl iron powder suspended in light oil, in the proportions of three parts of iron to one of oil by weight. When magnetized by the field of an electric coil, the iron particles form chains which unite the driving plate on the engine shaft with the driven plate, delivering the power to the mechanism.

Servo-mechanisms have been described as instruments to translate electronic "information" into appropriate action in purely mechanical equipment. Such devices are used for power steering of large trucks, tanks, steamships and airplanes. They are also used in high-speed electronic computers.

The possibility of applying this magnetic clutch to the solution of a servo problem is apparent, the REVIEW states. Simplicity of design and construction is one of its more practical advantages. In an operational sense, proportional power transmission control is possible with a relatively weak signal, and the system possesses inherent characteristics of high torque-inertia ratios, which offer short time responses. Advantage may therefore be taken of the system's momentum, to supply the peak power necessary for the rapid motion of large masses.

Science News Letter, August 27, 1949

ENGINEERING

Trucks and Buses Don't Need Special Gasolines

➤ TRUCKS and buses do not need special gasolines, experts now say. The fuel ordinarily used in passenger cars satisfactorily meets the anti-knock requirements of commercial motor vehicles, the Society of Automotive Engineers, meeting in Portland, Ore., was told in a report presented by a committee which made a special survey during the past year.

The survey disclosed that while commercial-vehicle engines have somewhat lower anti-knock requirements at high speed, and tend to rate the anti-knock value of sensitive fuels slightly lower than passenger-car engines, the fuel requirements of both types are quite similar. But proper adjustment of ignition systems is very important in the case of commercial vehicles.

The survey was made at scattered locations extending from Boston to San Francisco. Vehicles of different sizes and makes were used. They were tested both on reference fuels and commercial-type gasolines, first in the condition in which they were found, and again after new distributors had been installed, worn parts replaced, and ignition systems adjusted to manufacturers' specifications.

The report was prepared jointly by J. A. Edgar, Shell Oil Co., Martinez, Calif.; H. J. Gibson, Ethyl Corporation, Detroit; R. J. Greenshields, Shell Oil Co., Wood River, Ill.; and G. W. Pusack of the Socony-Vacuum Oil Co., Paulsboro, N. J.

Science News Letter, August 27, 1949

• Books of the Week •

TO SERVE YOU: To get books, send us a check or money order to cover retail price. Address Book Dept., SCIENCE NEWS LETTER, 1719 N St., N. W. Washington 6, D. C. Ask for free publications direct from issuing organizations.

THE BEST SCIENCE FICTION STORIES 1949—Everett F. Bleiler and T. E. Dikty, Eds.—*Fell*, 314 p., $2.95. Includes stories by many authors such as Ray Bradbury, Lewis Padgett, Martin Gardner, and J. J. Coupling reprinted from Astounding Science Fiction and other magazines for devoted fans.

DIAGNOSING BEE DISEASES IN THE APIARY—C. E. Burnside, P. Sturtevant, and E. C. Holst—*Gov't. Printing Office*, 31 p., illus., paper, ten cents. The crowded living conditions in a hive makes contagious disorders spread unless detected and treated.

DRINKING'S NOT THE PROBLEM—Charles Clapp, Jr.—*Crowell*, 179 p., $2.50. Written for the potential alcoholic by a former alcoholic.

GUADALCANAL: THE FIRST OFFENSIVE—The War in the Pacific: United States Army in World War II—John Miller, Jr.—*Gov't. Printing Office*, 413 p., illus., $4.00. The second combat volume to appear in the Army's far reaching historical project. Profusely illustrated with a hundred photographs and 36 maps.

A PROFESSIONAL GUIDE FOR JUNIOR ENGINEERS—William E. Wickenden and G. Ross Henninger—*Engineers' Council For Professional Development*, 55 p., paper, $1.00. Presents the philosophy and engineering ethics a young engineer needs for success as viewed by the authors.

REFRIGERATION FUNDAMENTALS—*The American Society of Refrigerating Engineers*, 6th ed., 692 p., illus., $7.00 in U. S.; $7.50 elsewhere. Covers basic data, fundamental principles, and practices of refrigeration.

SIXTH SEMIANNUAL REPORT OF THE ATOMIC ENERGY COMMISSION JULY 1949—Atomic Energy Commission—*Gov't. Printing Office*, 203 p., paper, 45 cents. This report sums up briefly the major developments and gives the status of the programs as they stood at the end of June 1949. A feature "Biology and Medicine" includes a brief description of the course of radiation illness followed for the past two years. Also published under the title ATOMIC ENERGY AND THE LIFE SCIENCES.

VERTEBRATE EMBRYOLOGY—Robert S. McEwen—*Holt*, 3rd ed., 699 p., illus., $4.90. Brought completely up-to-date with attempts to clarify various passages. Includes new work on the Pig.

WONDERS OF NEPTUNE'S KINGDOM—F. Martin Duncan—*Sampson Low*, 159 p., illus., $4.50. A description of the many wonders and problems of marine life, from the rock pools around the coasts of the British Isles to the Coral Islands. Beautifully illustrated with reproductions from the author's original photographs and drawings.

THE WORLD OF LIFE: A General Biology—Wolfgang F. Pauli—*Houghton Mifflin*, 653 p., illus., $5.00. A college text with evolutionary approach.

Science News Letter, August 27, 1949

AERONAUTICS

Train British Fliers Here

➤ THIRTY-SIX British pilots are now in the United States, learning to fly the Boeing Stratocruiser with the help of ground equipment, the Curtiss-Wright electronic flight simulator, now the property of Pan American World Airways and used by that company to train pilots.

These pilots from England are employees of the British Overseas Airways Corporation (BOAC), and are getting ready to operate Boeing Stratocruisers soon to be delivered to the company. Pan American has already trained American pilots and flight engineers, utilizing this equipment. About eight weeks will be required for the training course of the visiting pilots.

The electronic flight simulator reproduces in great detail the flight deck or cockpit of the airplane whose performance it is designed to reproduce. It incorporates all the existing data upon which the plane itself was produced. Without leaving the ground, it can accurately simulate any condition of flight of which the plane itself is capable.

The simulator, a huge electronic-mechanical device in a model of a cockpit with all the hundreds of dials, levers, switches and other controls which a pilot encounters in the plane, was conceived and designed by Dr. R. C. Dehmel, of the Curtiss-Wright Corporation, with the cooperation of the Boeing Aircraft Company. Similar simulators can be built to aid in training for other planes.

This flight simulator cost $250,000 to build. It looks like a lot of money to put into a training device, but as a "training plane" it can handle four times the flight and ground crews at a tenth of the cost and in a fraction of the time involved in the use of an actual plane.

One important feature of this flight simulator is that the entire operating crew, pilot, co-pilot, engineer and others, are trained at the same time. An instructor behind them operates switches which activate the pilot's dials to indicate trouble with fuel flow, wrong oil pressure, carburetor icing, faulty spark plugs and other difficulties. Pilot response is noted by him, and also the corrective action taken. This ground training is preliminary to final training in actual flight.

Science News Letter, August 27, 1949

MEDICINE

Once-Dread Plague Is Now Victim of Modern Medicine

➤ TWO cases of bubonic plague reported in New Mexico are the first cases of the once-dread disease known in this country since 1947, records at the U. S. Public Health Service show.

The feared "black death" of the Middle ages, bubonic plague has only been conquered effectively within the past half-dozen years. The new advances that combat plague include: DDT for killing off the infected fleas on rodents which spread the disease; sulfadiazine, which has prevented plague among persons exposed to the disease; and streptomycin, which cures plague.

Although no report has been received on how the victims were infected, the disease may have been brought into the country from abroad.

Science News Letter, August 27, 1949

GEOLOGY

"Dawn Redwood" Pollen Found in Scottish Coal

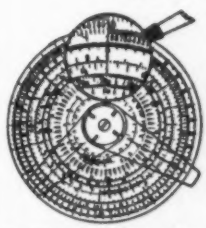
➤ TREES like the recently discovered Chinese "dawn redwood" grew in Scotland between 30 and 50 million years ago.

Fossil pollen grains like those of the living Chinese tree have been found in coal mined in the town of Mull, states Dr. John B. Simpson of the Geological Survey Office, Edinburgh, in the British science journal, NATURE (May 14).

The fossil pollen grains in the Mull coal are practically identical in shape, size and microscopic structure with pollen brought out of the Metasequoia forest of China. Dr. Simpson has not been able to find coal-embedded pollens resembling those of either the coast redwoods or the California big trees. Nearest things to his Metasequoia pollen grains, he notes, are two species of cypress, one found in China, the other in the United States.

Science News Letter, August 27, 1949

THE BINARY SLIDE RULE



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• New Machines and Gadgets •

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ZIPPER FIXER, for use in the home, is a simple, inexpensive handtool that will do the job without the removal of the zipper from the clothing. It is a plier-like tool with specially shaped jaws that are slid by hand-pressure under and over the zipper to repair any ordinary "fouled-up" conditions.

Science News Letter, August 27, 1949

TEMPORARY CAP for use on beverage bottles is close-fitting, easily attached and makes a tight seal, and features a one-inch arm which projects to one side that makes removal with one hand simple. The cap is made of a durable plastic, easily cleaned, and has a smooth upper surface on which a name can be put.

Science News Letter, August 27, 1949

UMBRELLA pocket in a raincoat or overcoat, recently patented, permits the carrying of a folded umbrella in an inconspicuous position over the right front of the thigh, extending from near the hip to near the knee, where it interferes neither with walking nor sitting.

Science News Letter, August 27, 1949

BATHROOM SCALES, shown in the picture, features a magnified dial on a hinged tower-like structure that is turned upward when the device is in use, but at other times is left in horizontal position, flat on the rubber mat of the scales. The one-foot height of the plastic tower makes the dial easy to read.

Science News Letter, August 27, 1949

PROTECTION device, for use with hoists and cranes to protect against overloading, is a U-shaped bar with rings to aid insertion between the crane hook and the load below. An electric switch within the arms of the U operates to cut the current to the motor if the weight to be lifted is above rated capacity of crane and cable.

Science News Letter, August 27, 1949

TOY JACK, weighing half a pound but which can be jacked up to a height of 6.5 inches, is an educational device for boys and can be used to jack up tricycles, wagons and similar mobile toys. An eight-inch worm gear with handle provides easy operation.

Science News Letter, August 27, 1949

WRESTLING MAT covers, made of tough Vinylite plastic flexible sheeting, have perfect traction for rubber shoes, while clothing and skin slide over it freely without injury. If small holes or cuts appear in it, they can be repaired by applying cold patches to the underside from the kit accompanying the cover.

Science News Letter, August 27, 1949

CALCULATING WRIST watch has a circular precision slide rule built around the dial. On turning the rim into which the watch crystal is set, the slide index, made of unbreakable glass, automatically rotates; its pointer is made to face noon where it remains, even if the rim goes on revolving, until the rim is turned the other way.

Science News Letter, August 27, 1949

Do You Know?

The so-called *bald-headed rock-fowl* of the Cameroon region, West Africa, is so rare that few white men have ever seen it.

Pure clean *water*, free from particles that might serve as nuclei for starting-points of freezing, does not begin to crystalize into ice at the ordinary freezing point of water, 32 degrees Fahrenheit, but at about zero.

By-product chemicals obtained in the manufacture of synthetic heating *oil and gasoline* from coal may become basic ingredients for materials for plastics, resins, lacquers, pharmaceuticals, solvents and explosives.

Germanium is an element on the chemical border line between metals and insulators; its crystals act as rectifiers in turning alternating to direct electric current, a property that permits its use in radio to replace vacuum tubes.

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